Medical Journal of Babylon, 7(1-2): 302-308. 2010

Folate Intake & the Percentage of Birth Defects in Babel Gynecology & Pediatrics Teaching Hospital

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Abstract:

Back ground: Folic acid deficiency has been studied as one of the factors responsible for congenital birth defects.

Aim of study : To determine the relation between poor folic acid supplement & incidence of birth defects.

Patients & methods: the study was conducted in Babylon Teaching Hospital for Gynaecology & Paediatrics from January 2008 to June 2008.

Sixty pregnant women were enrolled, exclusion criteria included those with risk factors for congenital anomalies such as those with diabetes mellitus or those taking anti-epileptic medications. After labour & delivery newborn babies were examined for any birth defects & registration of them if any exist.

Results: twenty percent of women under study were compliant with folic acid intake where as (38.33%) had poor compliance & (41.67%) did not take folic acid at all. The relative risk of birth defects in women with no folic acid supplement was approximately 2. the most common birth defect was anencephaly (42.8%) followed by hydrocephaly & meningocele (28.6%).

Conclusions& recommendations: folic acid deficiency is associated with increased risk of birth defects especially neural tube defects. We recommend that women of child bearing age should take folic acid supplement to decrease the risk of congenital birth defect, this will need more awareness of these women by using mass media & other educational resources to encourage folic acid intake.

Introducution:

Folic acid, sometimes called folate, is a B vitamin (B9) found mostly in leafy green vegetables like kale and spinach, orange juice, dried beans and peas in addition to enriched grains. Repeated studies have shown that women who get 400 micrograms (0.4 milligrams) daily prior to conception and during early pregnancy reduce the risk that their baby will be born with a serious neural tube defect by up to 70%. Neural tube defects (NTD) are the second most prevalent congenital anomaly in the United States, second only to cardiac malformations, and they are associated with substantial morbidity and mortality. (1)

The most common neural tube defects are spina bifida, anencephaly, and encephalocele. All of these defects occur during the first 28 days of pregnancy — usually before a woman even knows that she's pregnant. That's why it's so important for all women of childbearing age to get enough folic acid — not just those who are planning to become pregnant. Only 50% of pregnancies are planned, so any woman who could become pregnant should make sure she's getting enough folic acid [(1)].

This vitamin is crucial in the development of DNA. As a result, folic acid plays a large role in cell growth and development, as well as tissue formation. Folate is

necessary for the production and maintenance of new cells. It is especially important during periods of rapid cell division and growth such as infancy and pregnancy. Folate is needed to synthesize DNA bases (most notably thymine, but also purine bases) and also needed for DNA replication. Thus, folate deficiency hinders DNA synthesis and cell division, affecting, most notably, bone marrow and cancer, both of which participate in rapid cell division. RNA transcription, and subsequent protein synthesis, are less affected by folate deficiency, as the mRNA can be recycled and used again (as opposed to DNA synthesis where a new genomic copy must be created). Since folate deficiency limits cell division, erythropoiesis, production of red blood cells is hindered and leads to megaloblastic anemia which is characterized by large immature red blood cells [(2)]

Neural tube defects annually affect at least 300 000 newborns worldwide. Because folic acid is inexpensive, safe, and easy to use, many professional organizations and some governmental agencies promote the use of folic acid supplements to prevent neural tube defects. In addition Ionescu-Ittu et al. found that Public health measures to increase folic acid intake were followed by a decrease in the prevalence of severe congenital heart defects. These findings support the hypothesis that folic acid has a preventive effect on heart defects. [(3)] folic acid may also protect against other birth defects like cleft lip and palate. In one study, women who took multivitamins, got at least 400 mcg of folic acid daily, and ate a healthy diet had the lowest risk of delivering a child with an opening in the lip (cleft lip). [(4)]

Recommendations vary, but they typically include that women should eat a healthy diet and take folic acid supplements when planning a pregnancy or throughout childbearing age. [(5)]

In 1996, the Food and Drug Administration (FDA) published regulations requiring the addition of folic acid to enriched breads, cereals, flours, corn meals, pastas, rice, and other grain products. Since cereals and grains are widely consumed in the U.S., these products have become a very important contributor of folic acid to the American diet. [(6, 7)]

Patients & methods:

This study was conducted in Babylon Teaching Hospital for Gynaecology & Paediatrics in the period from the 1st of January 2008 to the 1st of June 2008. The study included sixty pregnant women in labour room, emergrncy unit, obstetric wards & consultation room. History taken from theses women using the following questionnaire:

- Name
- Age
- Occupation
- Residence
- Social & educational levels
- Gravidity, parity & previous abortions.
- Gestational age
- History of the current pregnancy, any exposure to X-ray or various medications in the first trimester
- Intake of folic acid during the first trimester & whether in a regular manner.
- Visits to primary health care centers.

- Previous delivery of baby with congenital anomalies
- Medical & drug history
- Family history of birth defects.

Women with increased risk of congenital anomalies like diabetic patients & those taking antiepileptic drugs were excluded from the study.
Women under study were followed through out labour & delivery & their newborns were examined thoroughly for any congenital anomalies & registering their types if exist.

Results:

Table no.1 shows the characteristics of the group under study regarding their ages, gravidity, parity & gestational age.

Table(1) Demographic characteristics of the sample.

Charateristics	mean
Maternal age (years)	28.6
Gravidity	3.3
Parity	2.2
Gestational age (weeks)	36.6

Table no. 2 shows age distribution of the sample. Most of women aged 21-30 years (43.3%) followed by the age group 31-40 (40%) while women who are 20 years old or less comprised 16 .7% of the total & none was above the age of forty.

Table (2) Age distribution of the sample

Age of patients (years)	Number	Percentage
20	10	16.7
21-30	26	43.3
31-40	24	40
>40	0	0
Total	60	60

Table no. 3 describes the socioeconomic state of the women under study. Most of them were of poor socioeconomic state (53.33%) followed by those of fair socioeconomic state (38.34%)

Table no.3 Description of women according to their socioeconomic state

Socioeconomic state	Number	Percentage
Poor	32	53.33
fair	23	38.34
Good	5	8.33
Total	60	100

Table no.4 describes folic acid intake by pregnant women. We found that most of women did not take folic acid at all (41.67%) whereas those who were taking folic acid in a regular manner form the least percentage (20%).

Table no.4 Folic acid intake by pregnant women

Folic Acid Intake by Pregnant women	Number	Percentage
Regular intake	12	20
Irregular intake	23	38.33
No intake	25	41.67
Total	60	100

Table (5) shows the relation between folic acid intake & birth defects. Birth defects in women with regular intake was (8.3%) while it was doubled in women with no intake (16%), the relative risk was 2.

Table (5) the relation between folic acid intake & birth defects.

Folic acid intake by pregnant women	Presence of birth defects			No birth defects		total
	No.	Percentage	Relative risk	No.	Percentage	
Regular intake	1	8.3	1	11	91.6	12
Irregular intake	2	8.6	1.03	21	91.3	23
No intake	4	16	2	21	84	25

Table (6) shows the frequency distribution of birth defects in the newborns of women under study. The most common birth defect found was anencephaly (42.8%) followed by hydrocephaly & meningocele (28.6%).

Table (6) frequency distribution of birth defects in newborn babies

Type of birth defect	No.	Percentage
Anencephaly	3	42.8
Hydrocephaly + meningocele	2	28.6
Cleft lip & palate	1	14.3
Club foot	1	14.3
Total	7	100

Discussion:

Folic acid deficiency has been studied as one of the causes of birth defects especially neural tube defects. In our study we found that only 20% of pregnant women in the sample took folic acid regularly while 38% took it in an irregular manner & the greatest percentage (41.6%) of women did not take it at all. This was in association with women's socioeconomic status. The higher the status the better is the intake of folic acid. This means that health education is an important factor to encourage women of reproductive age to take folic acid.

These results were similar to those found by a study done in New Delhi in India where Gautam et.al, studied the intake of iron, folic acid & vitamin C by pregnant women & found that the intake of folic acid was least in younger women & those of low socioeconomic class [(8)].

Another study done in Finland showed that the intake of folate containing foods by women of reproductive age in not enough to meet their body needs & they must take multivitamin & folic acid supplements to reach the effective blood levels of these minerals, again they found that younger women & those of low socioeconomic class are less compliant in taking folic acid supplementation [(9)].

The study showed that the incidence of congenital anomalies was higher in women who did not take folic acid supplement during pregnancy compared to those who took it in a regular manner. Also the incidence of congenital anomalies was higher in those with irregular intake of folic acid compared to women with regular intake. These results were in concordance with a study done in Canada showed that women who took multivitamin & folic acid supplements in pregnancy had lower incidence of congenital anomalies compared to women without such supplementations, they also found that most of the congenital anomalies that can be associated with folate deficiency are neural tube defects followed by congenital heart defects, cleft lip & plates & limb defects [(10)].

The types of congenital anomalies found in our sample included neural tube defects with the highest incidence (67.4%), of these (42.8%) were anencephaly & (28.6%) were hydrocephaly & meningocele, followed by cleft lip & palate & club foot. No heart defects were detected & the reason for this is that this type f defects is rarely detected at birth unless the baby has cyanosis despite oxygen supplementation or unexplained respiratory distress. However most of heart defects are detected by the family in the first few months or years of life. Confirmation of the presence or

absence of these defects need that each newborn baby should undergo echocardiography.

Other study done by Bollano et.al, concluded that Maternal consumption of folic acid-containing prenatal multivitamins is associated with decreased risk for several congenital anomalies, not only neural tube defects [(11)].

Wolff et.al, search for new evidence on the benefits and harms of folic acid supplementation for women of childbearing age to prevent neural tube defects in offspring. Their study supports previous evidence from a randomized, controlled trial that folic acid-containing supplements reduce the risk for NTD-affected pregnancies [(12)].

Conclusions:

1. Most pregnant women in Babylon province do not take folic acid supplementation.
2. Health education & socioeconomic status have great effect on female compliance with folic acid intake.
3. Most birth defects found in women who did not take folic acid in pregnancy.
4. Most of birth defects associated with poor folic acid intake were neural tube defects.

Recommendations:

1. Health educational programmes should be directed toward the whole society including pregnant women to elucidate the importance of folic acid supplementation in prevention of birth defects.
2. Encourage women who visit primary health centers to take folic acid prepregnancy & in the first trimester.
3. Training of medical staff working in health centers to educate women about the importance of folic acid intake in child bearing age.
4. wider studies are needed to including measuring serum folate to confirm deficiency.

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